

Basic EM and Power Engineering

ELEC 3105

Course Description

In this course, you will learn the fundamentals of electromagnetics (EM) and its application to motors, generators and electric power distribution.

Topics covered include:

- Electrostatics and magnetostatics;
- Solution of Poisson's and Laplace's equations;
- Lorenz equation and force; time varying fields;
- Magnetic circuits and transformers;
- DC motor and generator; induction motor; synchronous motor;
- Generator and three-phase power.

Textbooks

In this course you will need:

- M. Sadiku, “Elements of Electromagnetics”, 6th edition.
- F. Ulaby, “Fundamentals of Applied Electromagnetics”, 6th edition.
- J. R. Cogdell, “Foundations of Electric Power”, Prentice- Hall.
- M. Sadiku, “Fundamentals of Electric Circuits”, 4th Edition.
- S. Chapman, “Electric Machinery Fundamentals”, 5th Edition.

Textbooks, Lectures, and PA session are complementary to each other.



Course Grading

In this course:

- Labs 20%
- Quizzes (during PA sessions) 20%
- Final Exam (during normal exam period) 60%

No bonus mark, extra assignment, dropping a quiz,... is allowed.



Laboratories

In this course:

- Lab 1: Numerical Solution of Laplace's Equation
- Lab 2: Numerical Solution of Magnetostatic Problems
- Lab 3: Magnetic circuit
- Lab 4: Transformer
- Lab 5: Stepping Motor

PA sessions location is as mentioned on Carleton schedule. Labs are at **ME4275**.

Policies

Attendance: When you miss a class, it is your responsibility to obtain the missed information.

Email: It is your responsibility to manage your Carleton email. Make sure you receive any correspondence in regards to this course.

Plagiarism: It is a serious instructional offense that can not be tolerated. Students who plagiarize may receive an “F” or a “0” for the assignment, or an “F” for the course.

Academic: You must register with the Paul Menton Centre (PMC) for Students with Disabilities for a formal evaluation of disability-related needs.

Labs/PA sessions/Quizzes

- Lab and PA sessions are 3 hours in duration.
- Labs and PA sessions “alternate” from week to week and will be held according to the schedule shown on the course website.
- You must attend your lab and your PA session in the session you are assigned. Changing session is not allowed.
- Quizzes will be conducted during PA sessions.
- Absence (without permission) means zero for that lab/quiz.
- All submissions should be done via a dropbox on culearn. You have **one** week from the time lab is conducted. Late submissions are worth zero.

Expectations

Email:

- TAs are great resource. They should be your first line.
- Emails are read in weekdays from 8am to 4pm. Expect your answer in 48 hours. Questions of interest to all students will be answered in the class.

Note:

- The exam content will **not** be discussed. All course content is important.
- **Read** the Syllabus before sending any email.
- Professor and/or Teaching Assistants are offering office hours (see culearn).
- Cell phones must be muted and conversations saved for later.